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# Rulemaking Hearing Rule(s) Filing Form

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**Revision Type (check all that apply):**

___ Amendment
X New
X Repeal

**Rule(s) Revised (ALL** chapters and rules contained in filing must be listed here. If needed, copy and paste additional tables to accommodate multiple chapters. Please enter only **ONE** Rule Number/Rule Title per row)

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|---|---|
| 1200-02-12 | Radiation Safety Requirements for Well Logging |
| **Rule Number** | **Rule Title** |
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(Place substance of rules and other info here. Statutory authority must be given for each rule change. For information on formatting rules go to http://tn.gov/sos/rules/1360/1360.htm)

Repeal

Chapter 1200-02-12 Radiation Safety Requirements for Well Logging is repealed.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

New Rules

Chapter 0400-20-12
Radiation Safety Requirements for Well Logging

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0400-20-12-.01 Purpose.

This chapter prescribes requirements for the issuance of a license or acceptance of registration authorizing the use of sources of radiation including sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars in well logging in a single well. This chapter also prescribes radiation safety requirements for persons using sources of radiation in these operations.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.02 Scope.

The provisions and requirements of this chapter are in addition to, and not in substitution for, other requirements of these rules. The requirements set out in this chapter are not to be used to apply for the issuance of a license authorizing the use of radioactive material in tracer studies involving multiple wells, such as field flooding studies, or the use of sealed sources auxiliary to well logging but not lowered into wells.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.03 Definitions.

As used in this chapter, certain terms have the definitions set forth below: (Additional definitions may be found in Chapters 0400-20-04, 0400-20-05, 0400-20-06, 0400-20-08, 0400-20-09 and 0400-20-11.)

(1) "Aquifer" means a formation, group of formations, or part of a formation that contains a sufficient quantity of permeable material to yield significant quantities of water for wells and springs.

(2) "Energy compensation source (ECS)" means a small sealed source, with an activity not exceeding 3.7 MBq (100 microcuries), used within a logging tool, or other tool components, to provide a reference standard to maintain the tool's calibration when in use.

(3) "Field station" means a facility where sources of radiation may be stored or used and from which equipment is dispatched to temporary job-sites.

(4) "Fresh water aquifer" means, for the purpose of this chapter, a geologic formation that is capable of yielding fresh water to a well or spring.

(5) "Injection tool" means a device used for controlled subsurface injection of radioactive tracer material.

(6) "Irretrievable well logging source" means any sealed source containing radioactive material that is pulled off or not connected to the wireline that suspends the source in the well and for which all reasonable effort at recovery has been expended.

(7) "Logging assistant" means any individual who, under the personal supervision of a logging supervisor, handles sources of radiation or radioactive tracers that are not in logging tools or shipping containers or who performs surveys required by Rule 0400-20-12-.21.

(8) "Logging supervisor" means an individual who uses sources of radiation or provides personal supervision in the use of sources of radiation at a temporary job-site and who is responsible to the licensee or registrant for assuring compliance with the requirements of these regulations and the conditions of the license or registration.

(9) "Logging tool" means a device used subsurface to perform well logging.

(10) "Personal supervision" means guidance and instruction by a logging supervisor who is physically present at a temporary job-site, who is in personal contact with logging assistants, and who can give immediate assistance.

(11) "Radioactive marker" means radioactive material used for depth determination or direction orientation. For purposes of this chapter, this term includes radioactive collar markers and radioactive iron nails.

(12) "Safety review" means a periodic review provided by the licensee or registrant for its employees on radiation safety aspects of well logging. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, accidents or errors that have been observed, and opportunities for employees to ask safety questions.

(13) "Sealed source" - See Rule 0400-20-04-.04.

(14) "Source holder" means a housing or assembly into which a sealed source is placed to facilitate the handling and use of the source in well logging.

(15) "Subsurface tracer study" means the release of unsealed radioactive material or a substance labeled with radioactive material in a single well for the purpose of tracing the movement or position of the material or substance in the well or adjacent formation.

(16) "Surface casing for protecting fresh water aquifers" means a pipe or tube used as a lining in a well to isolate fresh water aquifers from the well.

(17) "Temporary job-site" means a place where sources of radiation are present for the purpose of performing well logging including subsurface tracer studies.

(18) "Tritium neutron generator target source" means a tritium source used within a neutron generator tube to produce neutrons for use in well logging applications.

(19) "Uranium sinker bar" means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.

(20) "Well" means a bored, drilled, driven or dug shaft or hole whose depth is greater than the largest surface dimension.

(21) "Well logging" means all operations involving the lowering and raising of measuring devices or tools which contain sources of radiation or are used to detect radioactive materials in wells for the purpose of obtaining information about the well or adjacent formations.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.04 Registration or Application for a License.

A person, as defined in Chapter 0400-20-05, shall file an application for a license authorizing the use of radioactive material in well logging or register radiation producing machines for use in well logging with the Division at the address in Rule 0400-20-04-.07.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.05 Registration and License for Well Logging.

(1) The Department may approve an application for a license for the use of radioactive material in well logging or a registration if the following requirements are met:

(a) The applicant shall satisfy the general requirements specified in Rules 0400-20-10-.12 and 0400-20-10-.24 and any special requirements contained in this chapter;

(b) The applicant or registrant shall develop a program for training logging supervisors and logging assistants and submit a description of this program which specifies the:

1. Initial training;

2. On-the-job training;

3. Annual safety reviews provided by the licensee or registrant;

4. Means the applicant or registrant will use to demonstrate the logging supervisor's knowledge and understanding of and ability to comply with the regulations, license, and the applicant's or registrant's operating and emergency procedures; and

5. Means the applicant or registrant will use to demonstrate the logging assistant's knowledge and understanding of and ability to comply with the applicant's operating and emergency procedures;

(c) The applicant or registrant shall submit written operating and emergency procedures as described in Rule 0400-20-12-.19 or an outline or summary of the procedures that includes the important radiation safety aspects of the procedures;

(d) The applicant or registrant shall establish and submit its program for annual inspections of the job performance of each logging supervisor to ensure that the regulations, license, and the applicant's or registrant's operating and emergency procedures are followed. Inspection records must be retained for 3 years after each annual internal inspection;

(e) The applicant or registrant shall submit a description of its overall organizational structure as it applies to the radiation safety responsibilities in well logging, including specified delegations of authority and responsibility; and

(f) If an applicant wants to perform leak testing of sealed sources, the applicant shall identity the manufacturers and the model numbers of the leak test kits to be used. If the applicant wants to analyze its own wipe samples, the applicant shall establish procedures to be followed and submit a description of these procedures. The description must include the:

1. Instruments to be used;

2. Methods of performing the analysis; and

3. Experience of the person who will analyze the wipe samples. Experience shall be commensurate with the analysis to be made.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.06 Agreement with Well Owner or Operator.

(1) A licensee may perform well logging with a sealed source only after the licensee has a written agreement with the employing well owner or operator. This written agreement must identify who will meet the following requirements:

(a) If a sealed source becomes lodged in the well, a reasonable effort will be made to recover it;

(b) A person may not attempt to recover a sealed source in a manner which is reasonably expected to result in its rupture;

(c) The radiation monitoring required in paragraph (1) of Rule 0400-20-12-.22 will be performed;

(d) If the environment, any equipment, or personnel are contaminated with radioactive material, they must be decontaminated before release for unrestricted use or release from the site; and

(e) If the sealed source is classified as irretrievable after reasonable efforts at recovery have been expended, the following requirements must be implemented within 30 days:

1. Each irretrievable well logging source must be immobilized and sealed in place with a cement plug.

2. A means to prevent inadvertent intrusion on the source, unless the source is not accessible to any subsequent drilling operations; and,

3. A permanent identification plaque, constructed of long lasting material such as stainless steel, brass, bronze, or monel, must be mounted at the surface of the well, unless the mounting of the plaque is not practical. The size of the plaque must be at least 7 inches (17 cm) square and 1/8-inch (3 mm) thick. The plaque must contain:

(i) The word "CAUTION";

(ii) The radiation symbol (the color requirement in paragraph (1) of Rule 0400-20-05-.110 need not be met);

(iii) The date the source was abandoned;

(iv) The name of the well owner or well operator, as appropriate;

(v) The well name and well identification number(s) or other designation;

(vi) An identification of the sealed source(s) by radionuclide and quantity;

(vii) The depth of the source and depth to the top of the plug; and

(viii) An appropriate warning, depending on the specific circumstances of each abandonment.[1]

(2) The licensee shall retain a copy of the written agreement for 3 years after the completion of the well logging operation.

(3) A licensee may apply for approval, on a case-by-case basis, of proposed procedures to abandon an irretrievable well logging source in a manner not otherwise authorized in subparagraph (1)(e) of this rule.

(4) A written agreement between the licensee and the well owner or operator is not required if the licensee and the well owner or operator are part of the same corporate structure or otherwise similarly affiliated. However, the licensee shall still otherwise meet the requirements in subparagraph (1)(a) through (e) of this rule.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.07 Labels, Security, and Transportation Precautions.

(1) Labels.

(a) The licensee may not use a source, source holder, or logging tool that contains radioactive material unless the smallest component that is transported as a separate piece of equipment with the radioactive material inside bears a durable, legible, and clearly visible marking or label. The marking or label must contain the radiation symbol specified in paragraph (1) of Rule 0400-20-05-.110 without the conventional color requirements, and the wording "DANGER (or CAUTION) RADIOACTIVE MATERIAL."

(b) The licensee may not use a container to store radioactive material unless the container has securely attached to it a durable, legible, and clearly visible label. The label must contain the radiation symbol specified in paragraph (1) of Rule 0400-20-05-.110 and the wording "CAUTION (or DANGER), RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES (or NAME OF COMPANY)."

(c) The licensee may not transport radioactive material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with Rule 0400-20-10-.30.

(2) Security precautions during storage and transportation.

(a) The licensee or registrant shall store each source of radiation in a storage container or transportation package. The container or package must be locked and physically secured to prevent tampering or removal of sources of radiation from storage by unauthorized personnel. The licensee shall store radioactive material in a manner which will minimize danger from explosion or fire.

(b) The licensee or registrant shall lock and physically secure the transport packages containing sources of radiation in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the sources of radiation from the vehicle.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.08 Radiation Detection Instruments.

(1) The licensee or registrant shall keep a calibrated and operable radiation survey instrument capable of detecting, as appropriate, beta, gamma and x–ray radiation at each field station and temporary job–site to make the radiation surveys required by this chapter and by Chapter 0400-20-05. To satisfy this

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[1] Appropriate warnings may include: (a) "Do not drill below plug-back depth"; (b) "Do not enlarge casing"; or (c) "Do not re-enter the hole" followed by the words, "before contacting the Division of Radiological Health."

requirement, the radiation survey instrument must be capable of measuring 0.001 mSv (0.1 mrem) per hour through at least 0.5 mSv (50 mrem) per hour.

(2) The licensee shall have available additional calibrated and operable radiation detection instruments sensitive enough to detect the low radiation and contamination levels that could be encountered if a sealed source ruptured. The licensee may own the instruments or may have a procedure to obtain them quickly from a second party.

(3) The licensee or registrant shall have each radiation survey instrument required under paragraph (1) of this rule calibrated:

(a) At intervals not to exceed 6 months and after instrument servicing;

(b) For linear scale instruments, at two points located approximately 1/3 and 2/3 of full-scale on each scale; for logarithmic scale instruments, at midrange of each decade, and at two points of at least one decade; and for digital instruments, at appropriate points; and

(c) So that an accuracy within plus or minus 20 percent of the calibration standard can be demonstrated on each scale.

(4) The licensee or registrant shall retain calibration records for a period of 3 years after the date of calibration for inspection by the Division.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.09 Leak Testing of Sealed Sources.

(1) Testing and record keeping requirements.

Each licensee who uses a sealed source shall have the source tested for leakage periodically. The licensee shall keep a record of leak test results in units of microcuries and retain the record for inspection by the Division for 3 years after the leak test is performed.

(2) Method of testing.

The wipe of a sealed source shall be performed using a leak test kit or method approved by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State. The wipe sample shall be taken from the nearest accessible point to the sealed source where contamination might accumulate. The wipe sample shall be analyzed for radioactive contamination. The analysis shall be capable of detecting the presence of 0.005 microcurie (185 Bq) of radioactive material on the test sample and shall be performed by a person approved by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State to perform the analysis.

(3) Test frequency.

(a) Each sealed source (except an energy compensation source [ECS]) shall be tested at intervals not to exceed 6 months. In the absence of a certificate from a transferor that a test has been made within the 6 months before the transfer, the sealed source shall not be used until tested.

(b) Each ECS that is not exempt from testing in accordance with paragraph (5) of this rule shall be tested at intervals not to exceed 3 years. In the absence of a certificate from a transferor that a test has been made within the 3 years before the transfer, the ECS may not be used until tested.

(4) Removal of leaking source from service:

(a) If the test conducted pursuant to paragraphs (1) and (2) of this rule reveals the presence of 0.005 microcurie (185 Bq) or more of removable radioactive material, the licensee shall remove the sealed source from service immediately and have it decontaminated, repaired, or disposed of by an Agreement State, U.S. Nuclear Regulatory Commission, or a Licensing State licensee that is

authorized to perform these functions. The licensee shall check the equipment associated with the leaking source for radioactive contamination and, if contaminated, have it decontaminated or disposed of by a Department, U.S. Nuclear Regulatory Commission, an Agreement State or Licensing State licensee that is authorized to perform these functions.

(b) Licensees shall submit written reports to the Division, at the address in Rule 0400-20-04-.07, within 5 days of receiving the test results. The report must describe the equipment involved in the leak, the test results, any contamination which resulted from the leaking source, and the corrective actions taken up to the time the report is made.

(5) The following sealed sources are not subject to the periodic leak test requirements set out in paragraphs (1) through (4) of this rule:

(a) Hydrogen-3 sources;

(b) Sources containing radioactive material with a half-life of 30 days or less;

(c) Sources containing radioactive material in gaseous form;

(d) Sources of beta- or gamma-emitting radioactive material with an activity of 100 microcuries (3,700,000 Bq) or less; and

(e) Sources of alpha- or neutron-emitting radioactive material with an activity of 10 microcuries (370,000 Bq) or less.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.10 Physical Inventory.

Each licensee or registrant shall conduct a semi-annual physical inventory to account for all sources of radiation received and possessed. The licensee or registrant shall retain records of the inventory for 3 years from the date of the inventory for inspection by the Division. The inventory must indicate the quantity and kind of sources of radiation, the location of the sources of radiation, the date of the inventory, and the name of the individual conducting the inventory. Physical inventory records may be combined with leak test records.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.11 Records of Material Use.

(1) Each licensee or registrant shall maintain records for each use of sources of radiation showing:

(a) The make, model number, and a serial number or a description of each source of radiation used;

(b) In the case of unsealed material used for subsurface tracer studies, the radionuclide and quantity of activity used in a particular well and the disposition of any unused tracer material;

(c) The identity of the logging supervisor who is responsible for the sources of radiation and the identity of logging assistants present; and

(d) The location and date of use of the sources of radiation.

(2) The licensee or registrant shall make the records required by paragraph (1) of this rule available for inspection by the Division. The licensee or registrant shall retain the records for 3 years from the date of the recorded event.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.12 Design and Performance Criteria for Sealed Sources.

(1) A licensee may use a sealed source in well logging if the sealed source:

(a) Is doubly encapsulated;

(b) Contains licensed material whose chemical and physical forms are as insoluble and nondispersible as practical; and

(c) Meets the requirements in paragraphs (2), (3) and (4) of this rule.

(2) For a sealed source manufactured on or before July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the requirements of USASI N5.10-1968, "Classification of Sealed Radioactive Sources," or the requirements in paragraph (3) or (4) of this rule.

(3) For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the oil-well logging requirements of ANSI/HPS N43.6-1997, "Sealed Radioactive Sources - Classification."

(4) For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications, if:

(a) The sealed source's prototype has been tested and found to maintain its integrity after each of the following tests:

1. Temperature.

The test source must be held at – 40° C for 20 minutes, 600° C for 1 hour, and then be subject to a thermal shock test with a temperature drop from 600° C to 20° C within 15 seconds.

2. Impact test.

A 5 kg steel hammer, 2.5 cm in diameter, must be dropped from a height of 1 m onto the test source.

3. Vibration.

The test source must be subject to a vibration from 25 Hz to 500 Hz at 5 g amplitude for 30 minutes.

4. Puncture test.

A 1 gram hammer and pin, 0.3 cm pin diameter must be dropped from a height of 1 m onto the test source.

5. Pressure test.

The test source must be subjected to an external pressure of 24,600 pounds per square inch absolute ($1.695 \times 10^7$ pascals).

(5) The requirements in paragraphs (1), (2), (3) and (4) of this rule do not apply to sealed sources that contain licensed material in gaseous form.

(6) The requirements in paragraph (1), (2), (3) and (4) of this rule do not apply to energy compensation sources (ECS). ECSs shall be registered with the Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.

Authority: T.C.A. §§ 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.13 Inspection, Maintenance, and Opening of Sources of Radiation.

(1) Each licensee or registrant shall visually check sources of radiation including source holders, logging tools, and source handling tools, for defects before each use to ensure that the equipment is in good working condition and that required labeling is present. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing:

(a) The date of check;

(b) Name of inspector;

(c) Equipment involved;

(d) Defects found; and

(e) Repairs made.

(2) The required records in paragraph (1) of this rule must be maintained for 3 years after the defect is found.

(3) Each licensee or registrant shall have a program for semiannual visual inspection and routine maintenance of sources of radiation including source holder, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars to ensure that the required labeling is legible and that no physical damage is visible. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing:

(a) The date of check;

(b) Equipment involved;

(c) Inspection and maintenance operations performed;

(d) Any defects found; and

(e) Any actions taken to correct the defects.

(4) The records required in paragraph (3) of this rule must be retained for 3 years after the defect is found.

(5) Removal of a sealed source from a source holder or logging tool, and maintenance on sealed sources or holders in which sealed sources are contained may not be performed by the licensee unless a written procedure developed pursuant to Rule 0400-20-12-.19 has been approved either by the Division pursuant to subparagraph (1)(c) of Rule 0400-20-12-.05 or by the U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State.

(6) If a sealed source is stuck in the source holder, the licensee may not perform any operation, such as drilling, cutting, or chiseling, on the source holder unless the licensee is specifically approved by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State to perform this operation.

(7) The opening, repair, or modification of any sealed source must be performed by persons specifically approved to do so by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.14 Subsurface Tracer Studies.

(1) The licensee shall require all personnel handling radioactive tracer material to use protective gloves and, if required by the license, other protective clothing and equipment. The licensee shall take precautions to avoid ingestion or inhalation of radioactive tracer material and to avoid contamination of field stations and temporary job-sites.

(2) A licensee may not knowingly inject radioactive material into aquifers unless specifically authorized to do so by the Division of Radiological Health and any other appropriate State agency.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.15 Radioactive Markers.

The licensee may use radioactive markers in wells only if the individual markers contain quantities of radioactive material not exceeding the quantities specified in Schedule RHS 8-31, Rule 0400-20-05-.161.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.16 Uranium Sinker Bars.

The licensee may use a uranium sinker bar in well logging only if it is legibly impressed with the words "CAUTION - RADIOACTIVE - DEPLETED URANIUM" and "NOTIFY CIVIL AUTHORITIES (or COMPANY NAME) IF FOUND."

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.17 Use of a Sealed Source in a Well without a Surface Casing.

The licensee may use a sealed source in a well without a surface casing for protecting aquifers only if the licensee follows a procedure for reducing the probability of the source becoming lodged in the well. The procedure must be approved by the Division pursuant to subparagraph (1)(c) of Rule 0400-20-12-.05 or by the U.S. Nuclear Regulatory Commission, a Licensing State or another Agreement State.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.18 Training.

(1) The licensee or registrant may not permit an individual to act as a logging supervisor until that person:

(a) Has completed training in the subjects outlined in paragraph (5) of this rule;

(b) Has received copies of, and instruction in:

1. These regulations;

2. The license or registration under which the logging supervisor will perform well logging; and

3. The licensee's or registrant's operating and emergency procedures required by Rule 0400-20-12-.19;

(c) Has completed on-the-job training and demonstrated competence in the use of sources of radiation, remote handling tools and radiation survey instruments by a field evaluation; and

(d) Has demonstrated understanding of the requirements in subparagraphs (a) and (b) of this paragraph by successfully completing a written test.

(2) The licensee or registrant may not permit an individual to act as a logging assistant until that person:

(a) Has received instruction in applicable sections of these regulations;

(b) Has received copies of, and instruction in, the licensee's or registrant's operating and emergency procedures required by Rule 0400-20-12-.19;

(c) Has demonstrated understanding of these regulations and of the licensee's or registrant's operating and emergency procedures listed in subparagraphs (a) and (b) of this paragraph by successfully completing a written or oral test; and

(d) Has received instruction in the use of sources of radiation, remote handling tools, and radiation survey instruments, as appropriate for the logging assistant's intended job responsibilities.

(3) The licensee or registrant shall provide safety reviews for logging supervisors and logging assistants at least once during each calendar year.

(4) The licensee shall maintain a record on each logging supervisor's and logging assistant's training and annual safety review. The training records must include copies of written tests and dates of oral tests. The training records must be retained until 3 years following the termination of employment. Records of annual safety reviews must list the topics discussed and be retained for 3 years.

(5) The licensee or registrant shall include the following subjects in the training required in subparagraph (1)(a) of this rule:

(a) Fundamentals of radiation safety including:

1. Characteristics of radiation;

2. Units of radiation dose and quantity of radioactivity;

3. Hazards of exposure to radiation;

4. Levels of radiation from sources of radiation;

5. Methods of controlling radiation dose (time, distance, and shielding); and

6. Radiation safety practices, including prevention of contamination, and methods of decontamination.

(b) Radiation detection instruments including:

1. Use, operation, calibration, and limitations of radiation survey instruments;

2. Survey techniques; and

3. Use of personnel monitoring equipment.

(c) Equipment to be used including:

1. Operation of equipment, including source handling equipment and remote handling tools;

2. Storage, control, and disposal of radioactive material; and

3. Maintenance of equipment;

(d) The requirements of pertinent regulations; and

(e) Case histories of accidents in well logging.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.19 Operating and Emergency Procedures.

(1) Each licensee or registrant shall develop and follow written operating and emergency procedures that cover:

(a) The handling and use of sources of radiation including the use of sealed sources in wells without surface casing for protecting aquifers, if appropriate;

(b) The use of remote handling tools for handling sealed sources and radioactive tracer material except low-activity calibration sources;

(c) Methods and occasions for conducting radiation surveys, including surveys for detecting contamination, as required by paragraphs (3) through (5) of Rule 0400-20-12-.21;

(d) Minimizing personnel exposure including exposures from inhalation and ingestion of radioactive tracer materials;

(e) Methods and occasions for locking and securing stored sources of radiation;

(f) Personnel monitoring and the use of personnel monitoring equipment;

(g) Transportation of radioactive materials to field stations or temporary job-sites, packaging of radioactive materials for transport in vehicles, placarding of vehicles when needed, and physically securing sources of radiation in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal;

(h) Picking up, receiving, and opening packages containing radioactive materials, in accordance with Rule 0400-20-05-.115;

(i) For the use of tracers, decontamination of the environment, equipment, and personnel;

(j) Maintenance of records generated by logging personnel at temporary job-sites;

(k) The inspection and maintenance of sources of radiation including sealed sources, source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars as required by Rule 0400-20-12-.13;

(l) Identifying and reporting to the Division defects and noncompliance as required;

(m) Actions to be taken if a sealed source is lodged in a well;

(n) Instructions for notifying responsible persons in the event of an accident; and

(o) Actions to be taken if a sealed source is ruptured including actions to prevent the spread of contamination and minimize inhalation and ingestion of radioactive materials and actions to obtain suitable radiation survey instruments as required by paragraph (2) of Rule 0400-20-12-.08.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.20 Personnel Monitoring.

(1) The licensee or registrant shall not permit an individual to act as a logging supervisor or logging assistant unless that person wears, at all times during the handling of sources of radiation, a personnel dosimeter that is processed and evaluated by an accredited National Voluntary Accreditation Program (NVLAP) processor. Each personnel dosimeter shall be assigned to and worn by only one individual. Film badges shall be replaced at least monthly and other personnel dosimeters replaced at least quarterly. After replacement, each personnel dosimeter shall be promptly processed.

(2) The licensee shall provide bioassay services to individuals using radioactive materials in subsurface tracer studies if required by the license.

(3) The licensee or registrant shall retain records of personnel dosimeters and bioassay results for inspection until the Division authorizes disposition of the records.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.21 Radiation Surveys.

(1) The licensee or registrant shall make all radiation surveys necessary, including the surveys required under paragraphs (2) through (5) of this rule, to ensure protection of health and safety of each area where radioactive materials and other sources of radiation are used and stored.

(2) Before transporting radioactive materials, the licensee shall make a radiation survey of the position occupied by each individual in the vehicle and of the exterior of each vehicle used to transport the radioactive materials.

(3) If the sealed source assembly is removed from the logging tool before departure from the temporary job-site, the licensee shall confirm that the logging tool is free of contamination by energizing the logging tool detector or by using a survey meter.

(4) If the licensee has reason to believe that, as a result of any operation involving a sealed source, the encapsulation of the sealed source could be damaged by the operation, the licensee shall conduct a radiation survey, including a contamination survey, during and after the operation.

(5) The licensee shall make a radiation survey at the temporary job-site before and after each subsurface tracer study to confirm the absence of contamination.

(6) The results of surveys required under paragraphs (1) through (5) of this rule must be recorded and must include the date of the survey, the name of the individual making the survey, the identification of the survey instrument used, and the location of the survey. The licensee or registrant shall retain records of surveys for inspection by the Division for 3 years after they are made.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.22 Radioactive Contamination Control.

(1) If the licensee detects evidence that a sealed source has ruptured or radioactive materials have caused contamination, the licensee shall initiate immediately the emergency procedures required by Rule 0400-20-12-.19.

(2) If contamination results from the use of radioactive material in well logging, the licensee shall decontaminate all work areas, equipment, and unrestricted areas.

(3) During efforts to recover a sealed source lodged in the well, a licensee shall continuously monitor, with an appropriate radiation detection instrument or logging tool with a radiation detector, the circulating fluids from the well, if any, to check for contamination resulting from damage to the sealed source.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.23 Security.

(1) A logging supervisor must be physically present at a temporary job-site whenever sources of radiation are being handled or are not stored and locked in a vehicle or storage place. The logging supervisor may leave the job-site in order to obtain assistance if a source becomes lodged in a well.

(2) During well logging, except when radiation sources are below ground or in shipping or storage containers, the logging supervisor or other individual designated by the logging supervisor shall maintain direct surveillance of the operation to prevent unauthorized entry into a restricted area, as defined in Rule 0400-20-05-.32.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.24 Documents and Records Required at Field Stations.

(1) Each licensee or registrant shall maintain the following documents and records at the field station:

(a) A copy of these regulations;

(b) The license authorizing the use of radioactive material or registration;

(c) Operating and emergency procedures required by Rule 0400-20-12-.19;

(d) The record of radiation survey instrument calibrations required by Rule 0400-20-12-.08;

(e) The record of leak test results required by Rule 0400-20-12-.09;

(f) Physical inventory records required by Rule 0400-20-12-.10;

(g) Utilization records required by Rule 0400-20-12-.11;

(h) Records of inspection and maintenance required by Rule 0400-20-12-.13;

(i) Training records required by paragraph (4) of Rule 0400-20-12-.18; and

(j) Survey records required by paragraph (6) of Rule 0400-20-12-.21.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.25 Documents and Records Required at Temporary Job-sites.

(1) Each licensee or registrant conducting operations at a temporary job-site shall maintain the following documents and records at the temporary job-site until the well logging operation is completed:

(a) Operating and emergency procedures required by Rule 0400-20-12-.19;

(b) Evidence of latest calibration of the radiation survey instruments in use at the site required by Rule 0400-20-12-.08;

(c) Latest survey records required by paragraphs (2), (3) and (5) of Rule 0400-20-12-.21;

(d) The shipping papers for the transportation of radioactive materials; and

(e) When operating under reciprocity pursuant to Rule 0400-20-10-.29, a copy of the license authorizing use of radioactive materials or a copy of registration for other sources of radiation.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

0400-20-12-.26 Notification of Incidents and Lost Sources; Abandonment Procedures for Irretrievable Sources.

(1) The licensee shall immediately notify the Division of Radiological Health by telephone and subsequently, within 30 days, by confirmatory letter if the licensee knows or has reason to believe that a sealed source has been ruptured. The letter must designate the well or other location, describe the magnitude and extent of the escape of radioactive materials, assess the consequences of the rupture, and explain efforts planned or being taken to mitigate these consequences.

(2) The licensee or registrant shall notify the Division of Radiological Health of the theft or loss of radioactive materials, radiation overexposures, excessive levels and concentrations of radiation, and certain other accidents as required by Rules 0400-20-05-.140, 0400-20-05-.141, and 0400-20-05-.143.

(3) If a sealed source becomes lodged in a well, and when it becomes apparent that efforts to recover the sealed source will not be successful, the licensee shall:

(a) Notify the Division of Radiological Health by telephone of the circumstances that resulted in the inability to retrieve the source and:

1. Obtain Division approval to implement abandonment procedures; or

2. That the licensee implemented abandonment before receiving Division approval because the licensee believed there was an immediate threat to public health and safety; and

(b) Advise the well owner or operator as appropriate, of the abandonment procedures under paragraph (1) or (3) of Rule 0400-20-12-.06; and

(c) Either ensure that abandonment procedures are implemented within 30 days after the sealed source has been classified as irretrievable or request an extension of time if unable to complete the abandonment procedures.

(4) Within 30 days after a sealed source has been classified as irretrievable, the licensee shall make a written report to the Division at the address in Rule 0400-20-04-.07. The licensee shall send a copy of the report to each state or Federal agency that issued permits or otherwise approved of the drilling operation. The report must contain the following information:

(a) Date of occurrence;

(b) A description of the irretrievable well logging source involved including the radionuclide and its quantity, chemical, and physical form;

(c) Surface location and identification of the well;

(d) Results of efforts to immobilize and seal the source in place;

(e) A brief description of the attempted recovery effort;

(f) Depth of the source;

(g) Depth of the top of the cement plug;

(h) Depth of the well;

(i) The immediate threat to public health and safety justification for implementing abandonment if prior Division approval was not obtained in accordance with part (3)(a)2 of this rule;

(j) Any other information, such as a warning statement, contained on the permanent identification plaque; and

(k) State and Federal agencies receiving a copy of this report.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

0400-20-12-.27 Energy Compensation Source.

(1) The licensee may use an energy compensation source (ECS) that is contained within a logging tool, or other tool components, only if the ECS contains quantities of licensed material not exceeding 100 microcuries (3.7 MBq).

(a) For well logging with a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of Rules 0400-20-12-.09, -.10 and -.11.

(b) For well logging without a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of Rules 0400-20-12-.06, -.09, -.10, -.11, -.17 and -.26.

0400-20-12-.28 Tritium Neutron Generator Target Source.

(1) Use of a tritium neutron generator target source, containing quantities not exceeding 30 curies (1,110 MBq) and in a well with a surface casing to protect fresh water aquifers, is subject to the requirements of this chapter except Rules 0400-20-12-.06, -.12, and -.26.

(2) Use of a tritium neutron generator target source, containing quantities exceeding 30 curies (1,110 MBq) or in a well without a surface casing to protect fresh water aquifers, is subject to the requirements of this chapter except Rule 0400-20-12-.12.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

I certify that this is an accurate and complete copy of rulemaking hearing rules, lawfully promulgated and adopted by the Commissioner on ~~08/10/2011~~ 08/15/2011, and is in compliance with the provisions of TCA 4-5-222.

I further certify the following:

Notice of Rulemaking Hearing filed with the Department of State on: 06/03/11

Rulemaking Hearing(s) Conducted on: (add more dates). 08/08/11

Date: August ~~10,~~ 15, 2011

Signature: Robert Martineau Jr

Name of Officer: Bob Martineau

Title of Officer: Commissioner

Subscribed and sworn to before me on: August 15, 2011

Notary Public Signature: Jo McCrary

My commission expires on: May 8, 2012

JO McCRARY STATE OF TENNESSEE NOTARY PUBLIC DAVIDSON COUNTY Commission Expires May 8, 2012

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All rulemaking hearing rules provided for herein have been examined by the Attorney General and Reporter of the State of Tennessee and are approved as to legality pursuant to the provisions of the Administrative Procedures Act, Tennessee Code Annotated, Title 4, Chapter 5.

R E Cooper Jr

Robert E. Cooper, Jr.
Attorney General and Reporter

1-30-12
Date

**Department of State Use Only**

Filed with the Department of State on: 02/22/2012

Effective on: 05/22/2012

Tre Hargett

Tre Hargett
Secretary of State

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PUBLICATIONS

**Public Hearing Comments**

One copy of a document containing responses to comments made at the public hearing must accompany the filing pursuant to T.C.A. §4-5-222. Agencies shall include only their responses to public hearing comments, which can be summarized. No letters of inquiry from parties questioning the rule will be accepted. When no comments are received at the public hearing, the agency need only draft a memorandum stating such and include it with the Rulemaking Hearing Rule filing. Minutes of the meeting will not be accepted. Transcripts are not acceptable.

No comments were received during the comment period.

**Regulatory Flexibility Addendum**
Pursuant to T.C.A. § 4-5-401 through 4-5-404, prior to initiating the rule making process as described in T.C.A. § 4-5-202(a)(3) and T.C.A. § 4-5-202(a), all agencies shall conduct a review of whether a proposed rule or rule affects small businesses.

(If applicable, insert Regulatory Flexibility Addendum here)

(1) The type or types of small business and an identification and estimate of the number of small businesses subject to the proposed rule that would bear the cost of, or directly benefit from the proposed rule:

This rulemaking that changes the rule numbers from Chapter 1200-20-12 and that makes other housekeeping changes makes no substantive changes. Therefore, there is no impact on small business.

(2) The projected reporting, recordkeeping, and other administrative costs required for compliance with the proposed rule, including the type of professional skills necessary for preparation of the report or record:

There are no projected additional reporting, recordkeeping or administrative costs as a result of this rulemaking.

(3) A statement of the probable effect on impacted small businesses and consumers:

There is no expected adverse affect on small businesses as a result of this rulemaking.

(4) A description of any less burdensome, less intrusive or less costly alternative methods of achieving the purpose and objectives of the proposed rule that may exist, and to what extent the alternative means might be less burdensome to small business:

The Department is unaware of alternatives to the proposed rules.

(5) A comparison of the proposed rule with any federal or state counterparts:

There is no exact match with any federal or state counterparts.

(6) Analysis of the effect of the possible exemption of small businesses from all or any part of the requirements contained in the proposed rule.

Due to the administrative nature of this rulemaking small businesses could not be exempt from this rulemaking.

**Impact on Local Governments**

Pursuant to T.C.A. 4-5-220 and 4-5-228 "any rule to proposed to be promulgated shall state in a simple declarative sentence, without additional comments on the merits of the policy of the rules or regulation, whether the rule or regulation may have a projected impact on local governments." (See Public Chapter Number 1070 (http://state.tn.us/sos/acts/106/pub/pc1070.pdf) of the 2010 Session of the General Assembly)

The Department does not anticipate that these amended rules will have a financial impact on local governments.

**Additional Information Required by Joint Government Operations Committee**

All agencies, upon filing a rule, must also submit the following pursuant to TCA 4-5-226(i)(1).

**(A)** A brief summary of the rule and a description of all relevant changes in previous regulations effectuated by such rule;

These rulemaking changes reflect a reorganization of all TDEC rules in order to be more logical and user friendly. This rulemaking affects Chapters 1200-02-04, 1200-02-05, 1200-02-06, 1200-02-07, 1200-02-08, 1200-02-09, 1200–02–10, 1200-02-11 and 1200-02-12. Its various additions and modifications will incorporate:

a. Changes to the numbering designation of Radiological Health rules from 1200-02 to 0400-20.

b. Correcting typographical errors throughout all Chapters.

c. Deleting obsolete language.

**(B)** A citation to and brief description of any federal law or regulation or any state law or regulation mandating promulgation of such rule or establishing guidelines relevant thereto;

These rules are promulgated under the authorities of T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq. and 4-5-201 et seq.

**(C)** Identification of persons, organizations, corporations or governmental entities most directly affected by this rule, and whether those persons, organizations, corporations or governmental entities urge adoption or rejection of this rule;

All licensees and Registrants will be affected by these amendments. The Division did not receive any comments urging the adoption or rejection of these amendments.

**(D)** Identification of any opinions of the attorney general and reporter or any judicial ruling that directly relates to the rule;

The Department is not aware of any.

**(E)** An estimate of the probable increase or decrease in state and local government revenues and expenditures, if any, resulting from the promulgation of this rule, and assumptions and reasoning upon which the estimate is based. An agency shall not state that the fiscal impact is minimal if the fiscal impact is more than two percent (2%) of the agency's annual budget or five hundred thousand dollars ($500,000), whichever is less;

The Department is not aware of any.

**(F)** Identification of the appropriate agency representative or representatives, possessing substantial knowledge and understanding of the rule;

Beth Murphy
Division of Radiological Health
3rd Floor L & C Tower 401 Church Street
Nashville, Tennessee 37243-1532

**(G)** Identification of the appropriate agency representative or representatives who will explain the rule at a scheduled meeting of the committees;

Alan M. Leiserson
Legal Services Director
Office of General Counsel

**(H)** Office address, telephone number, and email address of the agency representative or representatives who will explain the rule at a scheduled meeting of the committees; and

| |
|---|
| Office of General Counsel<br>Tennessee Department of Environment and Conservation<br>20th Floor L & C Tower<br>Nashville, Tennessee 37243-1548<br>(615) 532-0131<br>Alan.Leiserson@tn.gov |

**(I)** Any additional information relevant to the rule proposed for continuation that the committee requests.

| |
|---|
| The Department is not aware of any. |

REDLINE

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**For Department of State Use Only**

Sequence Number: 02-14-12
Rule ID(s): 5153-5154
File Date: 02/22/2012
Effective Date: 05/22/2012

# Rulemaking Hearing Rule(s) Filing Form

*Rulemaking Hearing Rules are rules filed after and as a result of a rulemaking hearing. TCA Section 4-5-205*

| | |
|---|---|
| **Agency/Board/Commission:** | Environment and Conservation |
| **Division:** | Radiological Health |
| **Contact Person:** | Beth Murphy |
| **Address:** | 3rd Floor L&C Annex<br>401 Church Street<br>Nashville, Tennessee |
| **Zip:** | 37243-1532 |
| **Phone:** | (615) 532-0392 |
| **Email:** | beth.murphy@tn.gov |

**Revision Type (check all that apply):**

___ Amendment
X New
X Repeal

**Rule(s) Revised (ALL** chapters and rules contained in filing must be listed here. If needed, copy and paste additional tables to accommodate multiple chapters. Please enter only **ONE** Rule Number/Rule Title per row)

| **Chapter Number** | **Chapter Title** |
|---|---|
| 0400-20-12 | Radiation Safety Requirements for Well Logging |
| **Rule Number** | **Rule Title** |
| 0400-20-12-.01 | Purpose |
| 0400-20-12-.02 | Scope |
| 0400-20-12-.03 | Definitions |
| 0400-20-12-.04 | Registration or Application for a License |
| 0400-20-12-.05 | Registration and License for Well Logging |
| 0400-20-12-.06 | Agreement with Well Owner or Operator |
| 0400-20-12-.07 | Labels, Security, and Transportation Precautions |
| 0400-20-12-.08 | Radiation Detection Instruments |
| 0400-20-12-.09 | Leak Testing of Sealed Sources |
| 0400-20-12-.10 | Physical Inventory |
| 0400-20-12-.11 | Records of Material Use |
| 0400-20-12-.12 | Design and Performance Criteria for Sealed Sources |
| 0400-20-12-.13 | Inspection, Maintenance, and Opening of Sources of Radiation |
| 0400-20-12-.14 | Subsurface Tracer Studies |
| 0400-20-12-.15 | Radioactive Markers |
| 0400-20-12-.16 | Uranium Sinker Bars |
| 0400-20-12-.17 | Use of a Sealed Source in a Well without a Surface Casing |
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| 0400-20-12-.19 | Operating and Emergency Procedures |
| 0400-20-12-.20 | Personnel Monitoring |
| 0400-20-12-.21 | Radiation Surveys |

| | |
|---|---|
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| 0400-20-12-.23 | Security |
| 0400-20-12-.24 | Documents and Records Required at Field Stations |
| 0400-20-12-.25 | Documents and Records Required at Temporary Job-sites |
| 0400-20-12-.26 | Notification of Incidents and Lost Sources; Abandonment Procedures for Irretrievable Sources |
| 0400-20-12-.27 | Energy Compensation Source |
| 0400-20-12-.28 | Tritium Neutron Generator Target Source |

| **Chapter Number** | **Chapter Title** |
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(Place substance of rules and other info here. Statutory authority must be given for each rule change. For information on formatting rules go to http://tn.gov/sos/rules/1360/1360.htm)

Repeal

Chapter 1200-02-12 Radiation Safety Requirements for Well Logging is repealed.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

New Rules

Chapter 0400-20-12
Radiation Safety Requirements for Well Logging

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| 0400-20-12-.13 | Inspection, Maintenance, and Opening of Sources of Radiation | 0400-20-12-.27 | Energy Compensation Source |
| 0400-20-12-.14 | Subsurface Tracer Studies | 0400-20-12-.28 | Tritium Neutron Generator Target Source |


~~1200-02-12-.01~~ 0400-20-12-.01 Purpose.

This chapter prescribes requirements for the issuance of a license or acceptance of registration authorizing the use of sources of radiation including sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars in well logging in a single well. This chapter also prescribes radiation safety requirements for persons using sources of radiation in these operations.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.02~~ 0400-20-12-.02 Scope.

The provisions and requirements of this chapter are in addition to, and not in substitution for, other requirements of these ~~regulations~~ rules. The requirements set out in this chapter are not to be used to apply for the issuance of a license authorizing the ~~sue~~ use of radioactive material in tracer studies involving multiple wells, such as field flooding studies, or the use of sealed sources auxiliary to well logging but not lowered into wells.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.03~~ 0400-20-12-.03 Definitions.

As used in this chapter, ~~0400-20-12,~~ certain terms have the definitions set forth below: (Additional definitions may be found in Chapters ~~1200-02-04~~ 0400-20-04, ~~1200-02-05~~ 0400-20-05, ~~1200-02-06~~ 0400-20-06, ~~1200-02-08~~ 0400-20-08, ~~1200-02-09~~ 0400-20-09 and ~~1200-02-11~~ 0400-20-11.)

(1) "Aquifer" means a formation, group of formations, or part of a formation that contains a sufficient quantity of permeable material to yield significant quantities of water for wells and springs.

~~(20)~~(2) "Energy compensation source (ECS)" means a small sealed source, with an activity not exceeding 3.7 MBq (100 microcuries), used within a logging tool, or other tool components, to provide a reference standard to maintain the tool's calibration when in use.

~~(2)~~(3) "Field station" means a facility where sources of radiation may be stored or used and from which equipment is dispatched to temporary job-sites.

~~(3)~~(4) "Fresh water aquifer" means, for the purpose of this chapter, a geologic formation that is capable of yielding fresh water to a well or spring.

~~(4)~~(5) "Injection tool" means a device used for controlled subsurface injection of radioactive tracer material.

~~(5)~~(6) "Irretrievable well logging source" means any sealed source containing radioactive material that is pulled off or not connected to the wireline that suspends the source in the well and for which all reasonable effort at recovery has been expended.

~~(6)~~(7) "Logging assistant" means any individual who, under the personal supervision of a logging supervisor, handles sources of radiation or radioactive tracers that are not in logging tools or shipping containers or who performs surveys required by ~~1200-02-12-.21~~ Rule 0400-20-12-.21.

~~(7)~~(8) "Logging supervisor" means an individual who uses sources of radiation or provides personal supervision in the use of sources of radiation at a temporary job-site and who is responsible to the licensee or registrant for assuring compliance with the requirements of these regulations and the conditions of the license or registration.

~~(8)~~(9) "Logging tool" means a device used subsurface to perform well logging.

~~(9)~~(10) "Personal supervision" means guidance and instruction by a logging supervisor who is physically present at a temporary job-site, who is in personal contact with logging assistants, and who can give immediate assistance.

~~(10)~~(11)"Radioactive marker" means radioactive material used for depth determination or direction orientation. For purposes of this chapter, this term includes radioactive collar markers and radioactive iron nails.

~~(11)~~(12)"Safety review" means a periodic review provided by the licensee or registrant for its employees on radiation safety aspects of well logging. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, accidents or errors that have been observed, and opportunities for employees to ask safety questions.

~~(12)~~(13)"Sealed source" - See Rule ~~1200-02-04-.04(1)(yy)~~ 0400-20-04-.04.

~~(13)~~(14)"Source holder" means a housing or assembly into which a sealed source is placed to facilitate the handling and use of the source in well logging.

~~(14)~~(15)"Subsurface tracer study" means the release of unsealed radioactive material or a substance labeled with radioactive material in a single well for the purpose of tracing the movement or position of the material or substance in the well or adjacent formation.

~~(15)~~(16)"Surface casing for protecting fresh water aquifers" means a pipe or tube used as a lining in a well to isolate fresh water aquifers from the well.

~~(16)~~(17)"Temporary job-site" means a place where sources of radiation are present for the purpose of performing well logging including subsurface tracer studies.

~~(21)~~(18)"Tritium neutron generator target source" means a tritium source used within a neutron generator tube to

produce neutrons for use in well logging applications.

~~(17)~~(19) "Uranium sinker bar" means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.

~~(18)~~(20) "Well" means a bored, drilled, driven or dug shaft or hole whose depth is greater than the largest surface dimension.

~~(19)~~(21) "Well logging" means all operations involving the lowering and raising of measuring devices or tools which contain sources of radiation or are used to detect radioactive materials in wells for the purpose of obtaining information about the well or adjacent formations.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.04~~ 0400-20-12-.04 Registration or Application for a License.

A person, as defined in Chapter ~~1200-02-05~~ 0400-20-05, shall file an application for a license authorizing the use of radioactive material in well logging or register radiation producing machines for use in well logging with the Division at the address in Rule ~~1200-02-04-.07~~ 0400-20-04-.07.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.05~~ 0400-20-12-.05 Registration and License for Well Logging.

(1) The Department may approve an application for a license for the use of radioactive material in well logging or a registration if the following requirements are met:

(a) The applicant shall satisfy the general requirements specified in ~~1200-02-10-.12~~ Rules 0400-20-10-.12 and ~~1200-02-10-.24~~ 0400-20-10-.24 and any special requirements contained in this chapter;

(b) The applicant or registrant shall develop a program for training logging supervisors and logging assistants and submit a description of this program which specifies the:

1. Initial training;

2. On-the-job training;

3. Annual safety reviews provided by the licensee or registrant;

4. Means the applicant or registrant will use to demonstrate the logging supervisor's knowledge and understanding of and ability to comply with the regulations, license, and the applicant's or registrant's operating and emergency procedures; and

5. Means the applicant or registrant will use to demonstrate the logging assistant's knowledge and understanding of and ability to comply with the applicant's operating and emergency procedures;

(c) The applicant or registrant shall submit written operating and emergency procedures as described in ~~1200-02-12-.19~~ Rule 0400-20-12-.19 or an outline or summary of the procedures that includes the important radiation safety aspects of the procedures;

(d) The applicant or registrant shall establish and submit its program for annual inspections of the job performance of each logging supervisor to ensure that the regulations, license, and the applicant's or registrant's operating and emergency procedures are followed. Inspection records must be retained for ~~three~~ 3 years after each annual internal inspection;

(e) The applicant or registrant shall submit a description of its overall organizational structure as it applies to the radiation safety responsibilities in well logging, including specified delegations of

authority and responsibility; and

(f) If an applicant wants to perform leak testing of sealed sources, the applicant shall identity the manufacturers and the model numbers of the leak test kits to be used. If the applicant wants to analyze its own wipe samples, the applicant shall establish procedures to be followed and submit a description of these procedures. The description must include the:

1. Instruments to be used;

2. Methods of performing the analysis; and

3. Experience of the person who will analyze the wipe samples. Experience shall be commensurate with the analysis to be made.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.06~~ 0400-20-12-.06 Agreement with Well Owner or Operator.

(1) A licensee may perform well logging with a sealed source only after the licensee has a written agreement with the employing well owner or operator. This written agreement must identify who will meet the following requirements:

(a) If a sealed source becomes lodged in the well, a reasonable effort will be made to recover it;

(b) A person may not attempt to recover a sealed source in a manner which is reasonably expected to result in its rupture;

(c) The radiation monitoring required in paragraph (1) of Rule ~~1200-02-12-.22~~ 0400-20-12-.22~~(1)~~ will be performed;

(d) If the environment, any equipment, or personnel are contaminated with radioactive material, they must be decontaminated before release for unrestricted use or release from the site; and

(e) If the sealed source is classified as irretrievable after reasonable efforts at recovery have been expended, the following requirements must be implemented within 30 days:

1. Each irretrievable well logging source must be immobilized and sealed in place with a cement plug.

2. A means to prevent inadvertent intrusion on the source, unless the source is not accessible to any subsequent drilling operations; and,

3. A permanent identification plaque, constructed of long lasting material such as stainless steel, brass, bronze, or monel, must be mounted at the surface of the well, unless the mounting of the plaque is not practical. The size of the plaque must be at least 7 inches (17 cm) square and 1/8-inch (3 mm) thick. The plaque must contain:

(i) The word "CAUTION";

(ii) The radiation symbol (the color requirement in paragraph (1) of Rule ~~1200-02-05-.110~~ 0400-20-05-.110~~(1)~~ need not be met);

(iii) The date the source was abandoned;

(iv) The name of the well owner or well operator, as appropriate;

(v) The well name and well identification number(s) or other designation;

(vi) An identification of the sealed source(s) by radionuclide and quantity;

(vii) The depth of the source and depth to the top of the plug; and

(viii) An appropriate warning, depending on the specific circumstances of each abandonment.[1]

(2) The licensee shall retain a copy of the written agreement for 3 years after the completion of the well logging operation.

(3) A licensee may apply for approval, on a case-by-case basis, of proposed procedures to abandon an irretrievable well logging source in a manner not otherwise authorized in subparagraph (1)(e) of this rule.

(4) A written agreement between the licensee and the well owner or operator is not required if the licensee and the well owner or operator are part of the same corporate structure or otherwise similarly affiliated. However, the licensee shall still otherwise meet the requirements in subparagraph (1)(a) through ~~(1)~~(e) of this rule.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.07~~ 0400-20-12-.07 Labels, Security, and Transportation Precautions.

(1) Labels.

(a) The licensee may not use a source, source holder, or logging tool that contains radioactive material unless the smallest component that is transported as a separate piece of equipment with the radioactive material inside bears a durable, legible, and clearly visible marking or label. The marking or label must contain the radiation symbol specified in paragraph (1) of Rule ~~1200-02-05-.110~~ 0400-20-05-.110~~(1)~~ without the conventional color requirements, and the wording "DANGER (or CAUTION) RADIOACTIVE MATERIAL."

(b) The licensee may not use a container to store radioactive material unless the container has securely attached to it a durable, legible, and clearly visible label. The label must contain the radiation symbol specified in paragraph (1) of Rule ~~1200-02-05-.110~~ 0400-20-05-.110~~(1)~~ and the wording "CAUTION (or DANGER), RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES (or NAME OF COMPANY)."

(c) The licensee may not transport radioactive material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with Rule ~~1200-02-10-.30~~ 0400-20-10-.30.

(2) Security precautions during storage and transportation.

(a) The licensee or registrant shall store each source of radiation in a storage container or transportation package. The container or package must be locked and physically secured to prevent tampering or removal of sources of radiation from storage by unauthorized personnel. The licensee shall store radioactive material in a manner which will minimize danger from explosion or fire.

(b) The licensee or registrant shall lock and physically secure the transport packages containing sources of radiation in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the sources of radiation from the vehicle.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.08~~ 0400-20-12-.08 Radiation Detection Instruments.

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[1] Appropriate warnings may include: (a) "Do not drill below plug-back depth"; (b) "Do not enlarge casing"; or (c) "Do not re-enter the hole" followed by the words, "before contacting the Division of Radiological Health."

(1) The licensee or registrant shall keep a calibrated and operable radiation survey instrument capable of detecting, as appropriate, beta, gamma and x–ray radiation at each field station and temporary job–site to make the radiation surveys required by this chapter and by Chapter ~~1200-02-05~~ 0400-20-05. To satisfy this requirement, the radiation survey instrument must be capable of measuring 0.001 mSv (0.1 mrem) per hour through at least 0.5 mSv (50 mrem) per hour.

(2) The licensee shall have available additional calibrated and operable radiation detection instruments sensitive enough to detect the low radiation and contamination levels that could be encountered if a sealed source ruptured. The licensee may own the instruments or may have a procedure to obtain them quickly from a second party.

(3) The licensee or registrant shall have each radiation survey instrument required under paragraph (1) of this rule calibrated:

(a) At intervals not to exceed 6 months and after instrument servicing;

(b) For linear scale instruments, at two points located approximately 1/3 and 2/3 of full-scale on each scale; for logarithmic scale instruments, at midrange of each decade, and at two points of at least one decade; and for digital instruments, at appropriate points; and

(c) So that an accuracy within plus or minus 20 percent of the calibration standard can be demonstrated on each scale.

(4) The licensee or registrant shall retain calibration records for a period of 3 years after the date of calibration for inspection by the Division.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.09~~ 0400-20-12-.09 Leak Testing of Sealed Sources.

(1) Testing and record keeping requirements.

Each licensee who uses a sealed source shall have the source tested for leakage periodically. The licensee shall keep a record of leak test results in units of microcuries and retain the record for inspection by the Division for ~~three (~~3~~)~~ years after the leak test is performed.

(2) Method of testing.

The wipe of a sealed source shall be performed using a leak test kit or method approved by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State. The wipe sample shall be taken from the nearest accessible point to the sealed source where contamination might accumulate. The wipe sample shall be analyzed for radioactive contamination. The analysis shall be capable of detecting the presence of 0.005 microcurie (185 Bq) of radioactive material on the test sample and shall be performed by a person approved by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State to perform the analysis.

(3) Test frequency.

(a) Each sealed source (except an energy compensation source [ECS]) shall be tested at intervals not to exceed ~~six (~~6~~)~~ months. In the absence of a certificate from a transferor that a test has been made within the ~~six (~~6~~)~~ months before the transfer, the sealed source shall not be used until tested.

(b) Each ECS that is not exempt from testing in accordance with paragraph ~~(e) of this section~~ (5) of this rule shall be tested at intervals not to exceed ~~three (~~3~~)~~ years. In the absence of a certificate from a transferor that a test has been made within the ~~three (~~3~~)~~ years before the transfer, the ECS may not be used until tested.

(4) Removal of leaking source from service:

(a) If the test conducted pursuant to paragraphs (1) and (2) of this rule reveals the presence of 0.005 microcurie (185 Bq) or more of removable radioactive material, the licensee shall remove the sealed source from service immediately and have it decontaminated, repaired, or disposed of by an Agreement State, U.S. Nuclear Regulatory Commission, or a Licensing State licensee that is authorized to perform these functions. The licensee shall check the equipment associated with the leaking source for radioactive contamination and, if contaminated, have it decontaminated or disposed of by a Department, U.S. Nuclear Regulatory Commission, an Agreement State or Licensing State licensee that is authorized to perform these functions.

(b) Licensees shall submit written reports to the Division, at the address in Rule ~~1200-02-04-.07~~ 0400-20-04-.07, within ~~five (5)~~ 5 days of receiving the test results. The report must describe the equipment involved in the leak, the test results, any contamination which resulted from the leaking source, and the corrective actions taken up to the time the report is made.

(5) The following sealed sources are not subject to the periodic leak test requirements set out in paragraphs (1) through (4) of this rule:

(a) Hydrogen-3 sources;

(b) Sources containing radioactive material with a half-life of 30 days or less;

(c) Sources containing radioactive material in gaseous form;

(d) Sources of beta- or gamma-emitting radioactive material with an activity of 100 microcuries (3,700,000 Bq) or less; and

(e) Sources of alpha- or neutron-emitting radioactive material with an activity of 10 microcuries (370,000 Bq) or less.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.10~~ 0400-20-12-.10 Physical Inventory.

Each licensee or registrant shall conduct a semi-annual physical inventory to account for all sources of radiation received and possessed. The licensee or registrant shall retain records of the inventory for 3 years from the date of the inventory for inspection by the Division. The inventory must indicate the quantity and kind of sources of radiation, the location of the sources of radiation, the date of the inventory, and the name of the individual conducting the inventory. Physical inventory records may be combined with leak test records.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.11~~ 0400-20-12-.11 Records of Material Use.

(1) Each licensee or registrant shall maintain records for each use of sources of radiation showing:

(a) The make, model number, and a serial number or a description of each source of radiation used;

(b) In the case of unsealed material used for subsurface tracer studies, the radionuclide and quantity of activity used in a particular well and the disposition of any unused tracer material;

(c) The identity of the logging supervisor who is responsible for the sources of radiation and the identity of logging assistants present; and

(d) The location and date of use of the sources of radiation.

(2) The licensee or registrant shall make the records required by paragraph (1) of this rule available for inspection by the Division. The licensee or registrant shall retain the records for 3 years from the date of the recorded event.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.12~~ 0400-20-12-.12 Design and Performance Criteria for Sealed Sources.

(1) A licensee may use a sealed source in well logging if the sealed source:

(a) Is doubly encapsulated;

(b) Contains licensed material whose chemical and physical forms are as insoluble and nondispersible as practical; and

(c) Meets the requirements in paragraphs (2), (3) and (4) of this rule.

(2) For a sealed source manufactured on or before July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the requirements of USASI N5.10-1968, "Classification of Sealed Radioactive Sources," or the requirements in paragraph (3) or (4) of this rule.

(3) For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the oil-well logging requirements of ANSI/HPS N43.6-1997, "Sealed Radioactive Sources - Classification."

(4) For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications, if:

(a) The sealed source's prototype has been tested and found to maintain its integrity after each of the following tests:

1. Temperature.

The test source must be held at – 40° C for 20 minutes, 600° C for 1 hour, and then be subject to a thermal shock test with a temperature drop from 600° C to 20° C within 15 seconds.

2. Impact test.

A 5 kg steel hammer, 2.5 cm in diameter, must be dropped from a height of 1 m onto the test source.

3. Vibration.

The test source must be subject to a vibration from 25 Hz to 500 Hz at 5 g amplitude for 30 minutes.

4. Puncture test.

A 1 gram hammer and pin, 0.3 cm pin diameter must be dropped from a height of 1 m onto the test source.

5. Pressure test.

The test source must be subjected to an external pressure of 24,600 pounds per square inch absolute ($1.695 \times 10^7$ pascals).

(5) The requirements in paragraphs (1), (2), (3) and (4) of this rule do not apply to sealed sources that contain licensed material in gaseous form.

(6) The requirements in paragraph (1), (2), (3) and (4) of this rule do not apply to energy compensation sources (ECS). ECSs shall be registered with the Nuclear Regulatory Commission under 10 CFR 32.210

or with an Agreement State.

Authority: T.C.A. §§ 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.13~~ 0400-20-12-.13 Inspection, Maintenance, and Opening of Sources of Radiation.

(1) Each licensee or registrant shall visually check sources of radiation including source holders, logging tools, and source handling tools, for defects before each use to ensure that the equipment is in good working condition and that required labeling is present. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing:

(a) The date of check;

(b) Name of inspector;

(c) Equipment involved;

(d) Defects found; and

(e) Repairs made.

(2) The required records in paragraph (1) of this rule must be maintained for 3 years after the defect is found.

(3) Each licensee or registrant shall have a program for semiannual visual inspection and routine maintenance of sources of radiation including source holder, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars to ensure that the required labeling is legible and that no physical damage is visible. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing:

(a) The date of check;

(b) Equipment involved;

(c) Inspection and maintenance operations performed;

(d) Any defects found; and

(e) Any actions taken to correct the defects.

(4) The records required in paragraph (3) of this rule must be retained for 3 years after the defect is found.

(5) Removal of a sealed source from a source holder or logging tool, and maintenance on sealed sources or holders in which sealed sources are contained may not be performed by the licensee unless a written procedure developed pursuant to Rule ~~1200-02-12-.19~~ 0400-20-12-.19 has been approved either by the Division pursuant to subparagraph (1)(c) of Rule ~~1200-02-12-.05~~ 0400-20-12-.05~~(1)(c)~~ or by the U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State.

(6) If a sealed source is stuck in the source holder, the licensee may not perform any operation, such as drilling, cutting, or chiseling, on the source holder unless the licensee is specifically approved by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State to perform this operation.

(7) The opening, repair, or modification of any sealed source must be performed by persons specifically approved to do so by the Division, U.S. Nuclear Regulatory Commission, a Licensing State or an Agreement State.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.14~~ 0400-20-12-.14 Subsurface Tracer Studies.

(1) The licensee shall require all personnel handling radioactive tracer material to use protective gloves and, if required by the license, other protective clothing and equipment. The licensee shall take precautions to avoid ingestion or inhalation of radioactive tracer material and to avoid contamination of field stations and temporary job-sites.

(2) A licensee may not knowingly inject radioactive material into aquifers unless specifically authorized to do so by the Division of Radiological Health and any other appropriate State agency.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.15~~ 0400-20-12-.15 Radioactive Markers.

The licensee may use radioactive markers in wells only if the individual markers contain quantities of radioactive material not exceeding the quantities specified in Schedule RHS 8-31, ~~Chapter~~ Rule ~~1200-02-05-.161~~ 0400-20-05-.161.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.16~~ 0400-20-12-.16 Uranium Sinker Bars.

The licensee may use a uranium sinker bar in well logging only if it is legibly impressed with the words "CAUTION - RADIOACTIVE - DEPLETED URANIUM" and "NOTIFY CIVIL AUTHORITIES (or COMPANY NAME) IF FOUND."

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.17~~ 0400-20-12-.17 Use of a Sealed Source in a Well without a Surface Casing.

The licensee may use a sealed source in a well without a surface casing for protecting aquifers only if the licensee follows a procedure for reducing the probability of the source becoming lodged in the well. The procedure must be approved by the Division pursuant to subparagraph (1)(c) of Rule ~~1200-02-12-.05~~ 0400-20-12-.05~~(1)(c)~~ or by the U.S. Nuclear Regulatory Commission, a Licensing State or another Agreement State.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.18~~ 0400-20-12-.18 Training.

(1) The licensee or registrant may not permit an individual to act as a logging supervisor until that person:

(a) Has completed training in the subjects outlined in paragraph (5) of this rule;

(b) Has received copies of, and instruction in:

1. These regulations;

2. The license or registration under which the logging supervisor will perform well logging; and

3. The licensee's or registrant's operating and emergency procedures required by Rule ~~1200-02-12-.19~~ 0400-20-12-.19;

(c) Has completed on-the-job training and demonstrated competence in the use of sources of radiation, remote handling tools and radiation survey instruments by a field evaluation; and

(d) Has demonstrated understanding of the requirements in subparagraphs ~~(1)~~(a) and (b) of this ~~rule~~ paragraph by successfully completing a written test.

(2) The licensee or registrant may not permit an individual to act as a logging assistant until that person:

(a) Has received instruction in applicable sections of these regulations;

(b) Has received copies of, and instruction in, the licensee's or registrant's operating and emergency procedures required by Rule ~~1200-02-12-.19~~ 0400-20-12-.19;

(c) Has demonstrated understanding of these regulations and of the licensee's or registrant's operating and emergency procedures listed in subparagraphs ~~(2)~~(a) and (b) of this ~~rule~~ paragraph by successfully completing a written or oral test; and

(d) Has received instruction in the use of sources of radiation, remote handling tools, and radiation survey instruments, as appropriate for the logging assistant's intended job responsibilities.

(3) The licensee or registrant shall provide safety reviews for logging supervisors and logging assistants at least once during each calendar year.

(4) The licensee shall maintain a record on each logging supervisor's and logging assistant's training and annual safety review. The training records must include copies of written tests and dates of oral tests. The training records must be retained until 3 years following the termination of employment. Records of annual safety reviews must list the topics discussed and be retained for 3 years.

(5) The licensee or registrant shall include the following subjects in the training required in subparagraph (1)(a) of this rule:

(a) Fundamentals of radiation safety including:

1. Characteristics of radiation;

2. Units of radiation dose and quantity of radioactivity;

3. Hazards of exposure to radiation;

4. Levels of radiation from sources of radiation;

5. Methods of controlling radiation dose (time, distance, and shielding); and

6. Radiation safety practices, including prevention of contamination, and methods of decontamination.

(b) Radiation detection instruments including:

1. Use, operation, calibration, and limitations of radiation survey instruments;

2. Survey techniques; and

3. Use of personnel monitoring equipment.

(c) Equipment to be used including:

1. Operation of equipment, including source handling equipment and remote handling tools;

2. Storage, control, and disposal of radioactive material; and

3. Maintenance of equipment;

(d) The requirements of pertinent regulations; and

(e) Case histories of accidents in well logging.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.19~~ 0400-20-12-.19 Operating and Emergency Procedures.

(1) Each licensee or registrant shall develop and follow written operating and emergency procedures that cover:

(a) The handling and use of sources of radiation including the use of sealed sources in wells without surface casing for protecting aquifers, if appropriate;

(b) The use of remote handling tools for handling sealed sources and radioactive tracer material except low-activity calibration sources;

(c) Methods and occasions for conducting radiation surveys, including surveys for detecting contamination, as required by paragraphs (3) through (5) of Rule ~~1200-02-12-.21~~ 0400-20-12-.21~~(3) through (5)~~;

(d) Minimizing personnel exposure including exposures from inhalation and ingestion of radioactive tracer materials;

(e) Methods and occasions for locking and securing stored sources of radiation;

(f) Personnel monitoring and the use of personnel monitoring equipment;

(g) Transportation of radioactive materials to field stations or temporary job-sites, packaging of radioactive materials for transport in vehicles, placarding of vehicles when needed, and physically securing sources of radiation in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal;

(h) Picking up, receiving, and opening packages containing radioactive materials, in accordance with Rule ~~1200-02-12-.115~~ 0400-20-05-.115;

(i) For the use of tracers, decontamination of the environment, equipment, and personnel;

(j) Maintenance of records generated by logging personnel at temporary job-sites;

(k) The inspection and maintenance of sources of radiation including sealed sources, source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars as required by Rule ~~1200-02-12-.13~~ 0400-20-12-.13;

(l) Identifying and reporting to the Division defects and noncompliance as required;

(m) Actions to be taken if a sealed source is lodged in a well;

(n) Instructions for notifying responsible persons in the event of an accident; and

(o) Actions to be taken if a sealed source is ruptured including actions to prevent the spread of contamination and minimize inhalation and ingestion of radioactive materials and actions to obtain suitable radiation survey instruments as required by paragraph (2) of Rule ~~1200-02-12-.08~~ 0400-20-12-.08~~(2)~~.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.20~~ 0400-20-12-.20 Personnel Monitoring.

(1) The licensee or registrant shall not permit an individual to act as a logging supervisor or logging assistant unless that person wears, at all times during the handling of sources of radiation, a personnel dosimeter that is processed and evaluated by an accredited National Voluntary Accreditation Program (NVLAP) processor. Each personnel dosimeter shall be assigned to and worn by only one individual. Film badges

shall be replaced at least monthly and other personnel dosimeters replaced at least quarterly. After replacement, each personnel dosimeter shall be promptly processed.

(2) The licensee shall provide bioassay services to individuals using radioactive materials in subsurface tracer studies if required by the license.

(3) The licensee or registrant shall retain records of personnel dosimeters and bioassay results for inspection until the Division authorizes disposition of the records.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.21~~ 0400-20-12-.21 Radiation Surveys.

(1) The licensee or registrant shall make all radiation surveys necessary, including the surveys required under paragraphs (2) through (5) of this rule, to ensure protection of health and safety of each area where radioactive materials and other sources of radiation are used and stored.

(2) Before transporting radioactive materials, the licensee shall make a radiation survey of the position occupied by each individual in the vehicle and of the exterior of each vehicle used to transport the radioactive materials.

(3) If the sealed source assembly is removed from the logging tool before departure from the temporary job-site, the licensee shall confirm that the logging tool is free of contamination by energizing the logging tool detector or by using a survey meter.

(4) If the licensee has reason to believe that, as a result of any operation involving a sealed source, the encapsulation of the sealed source could be damaged by the operation, the licensee shall conduct a radiation survey, including a contamination survey, during and after the operation.

(5) The licensee shall make a radiation survey at the temporary job-site before and after each subsurface tracer study to confirm the absence of contamination.

(6) The results of surveys required under paragraphs (1) through (5) of this rule must be recorded and must include the date of the survey, the name of the individual making the survey, the identification of the survey instrument used, and the location of the survey. The licensee or registrant shall retain records of surveys for inspection by the Division for 3 years after they are made.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.22~~ 0400-20-12-.22 Radioactive Contamination Control.

(1) If the licensee detects evidence that a sealed source has ruptured or radioactive materials have caused contamination, the licensee shall initiate immediately the emergency procedures required by ~~1200-02-12-.19~~ Rule 0400-20-12-.19.

(2) If contamination results from the use of radioactive material in well logging, the licensee shall decontaminate all work areas, equipment, and unrestricted areas.

(3) During efforts to recover a sealed source lodged in the well, a licensee shall continuously monitor, with an appropriate radiation detection instrument or logging tool with a radiation detector, the circulating fluids from the well, if any, to check for contamination resulting from damage to the sealed source.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.23~~ 0400-20-12-.23 Security.

(1) A logging supervisor must be physically present at a temporary job-site whenever sources of radiation are being handled or are not stored and locked in a vehicle or storage place. The logging supervisor may leave the job-site in order to obtain assistance if a source becomes lodged in a well.

(2) During well logging, except when radiation sources are below ground or in shipping or storage containers, the logging supervisor or other individual designated by the logging supervisor shall maintain direct surveillance of the operation to prevent unauthorized entry into a restricted area, as defined in Rule ~~1200-02-12-.32(62)~~ 0400-20-05-.32.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.24~~ 0400-20-12-.24 Documents and Records Required at Field Stations.

(1) Each licensee or registrant shall maintain the following documents and records at the field station:

(a) A copy of these regulations;

(b) The license authorizing the use of radioactive material or registration;

(c) Operating and emergency procedures required by Rule ~~1200-02-12-.19~~ 0400-20-12-.19;

(d) The record of radiation survey instrument calibrations required by Rule ~~1200-02-12-.08~~ 0400-20-12-.08;

(e) The record of leak test results required by Rule ~~1200-02-12-.09~~ 0400-20-12-.09;

(f) Physical inventory records required by Rule ~~1200-02-12-.10~~ 0400-20-12-.10;

(g) Utilization records required by Rule ~~1200-02-12-.11~~ 0400-20-12-.11;

(h) Records of inspection and maintenance required by Rule ~~1200-02-12-.13~~ 0400-20-12-.13;

(i) Training records required by paragraph (4) of Rule ~~1200-02-12-.18~~ 0400-20-12-.18~~(4)~~; and

(j) Survey records required by paragraph (6) of Rule ~~1200-02-12-.21~~ 0400-20-12-.21~~(6)~~.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.25~~ 0400-20-12-.25 Documents and Records Required at Temporary Job-sites.

(1) Each licensee or registrant conducting operations at a temporary job-site shall maintain the following documents and records at the temporary job-site until the well logging operation is completed:

(a) Operating and emergency procedures required by Rule ~~1200-02-12-.19~~ 0400-20-12-.19;

(b) Evidence of latest calibration of the radiation survey instruments in use at the site required by Rule ~~1200-02-12-.08~~ 0400-20-12-.08;

(c) Latest survey records required by paragraphs (2), (3) and (5) of Rule ~~1200-02-12-.21~~ 0400-20-12-.21~~(2), (3), and (5)~~;

(d) The shipping papers for the transportation of radioactive materials; and

(e) When operating under reciprocity pursuant to Rule ~~1200-02-10-.29~~ 0400-20-10-.29, a copy of the license authorizing use of radioactive materials or a copy of registration for other sources of radiation.

Authority: T.C.A. §§ 68-202-101 et seq. and 4-5-201 et seq.

~~1200-02-12-.26~~ 0400-20-12-.26 Notification of Incidents and Lost Sources; Abandonment Procedures for Irretrievable Sources.

(1) The licensee shall immediately notify the Division of Radiological Health by telephone and subsequently, within 30 days, by confirmatory letter if the licensee knows or has reason to believe that a sealed source has been ruptured. The letter must designate the well or other location, describe the magnitude and extent of the escape of radioactive materials, assess the consequences of the rupture, and explain efforts planned or being taken to mitigate these consequences.

(2) The licensee or registrant shall notify the Division of Radiological Health of the theft or loss of radioactive materials, radiation overexposures, excessive levels and concentrations of radiation, and certain other accidents as required by Rules ~~1200-02-05-.140~~ 0400-20-05-.140, ~~1200-02-05-.141~~ 0400-20-05-.141, and ~~1200-02-05-.143~~ 0400-20-05-.143.

(3) If a sealed source becomes lodged in a well, and when it becomes apparent that efforts to recover the sealed source will not be successful, the licensee shall:

(a) Notify the Division of Radiological Health by telephone of the circumstances that resulted in the inability to retrieve the source and:

1. Obtain Division approval to implement abandonment procedures; or

2. That the licensee implemented abandonment before receiving Division approval because the licensee believed there was an immediate threat to public health and safety; and

(b) Advise the well owner or operator as appropriate, of the abandonment procedures under paragraph (1) or (3) of Rule ~~1200-02-12-.06~~ 0400-20-12-.06~~(1) or (3)~~; and

(c) Either ensure that abandonment procedures are implemented within 30 days after the sealed source has been classified as irretrievable or request an extension of time if unable to complete the abandonment procedures.

(4) Within 30 days after a sealed source has been classified as irretrievable, the licensee shall make a written report to the Division at the address in Rule ~~1200-02-04-.07~~ 0400-20-04-.07. The licensee shall send a copy of the report to each state or Federal agency that issued permits or otherwise approved of the drilling operation. The report must contain the following information:

(a) Date of occurrence;

(b) A description of the irretrievable well logging source involved including the radionuclide and its quantity, chemical, and physical form;

(c) Surface location and identification of the well;

(d) Results of efforts to immobilize and seal the source in place;

(e) A brief description of the attempted recovery effort;

(f) Depth of the source;

(g) Depth of the top of the cement plug;

(h) Depth of the well;

(i) The immediate threat to public health and safety justification for implementing abandonment if prior Division approval was not obtained in accordance with part (3)(a)2 of this rule;

(j) Any other information, such as a warning statement, contained on the permanent identification plaque; and

(k) State and Federal agencies receiving a copy of this report.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.

~~1200-02-12-.27~~ 0400-20-12-.27 Energy Compensation Source.

(1) The licensee may use an energy compensation source (ECS) that is contained within a logging tool, or other tool components, only if the ECS contains quantities of licensed material not exceeding 100 microcuries (3.7 MBq).

(a) For well logging with a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of Rules ~~1200-02-12-.09~~ 0400-20-12-.09, -.10 and -.11.

(b) For well logging without a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of Rules ~~1200-02-12-.06~~ 0400-20-12-.06, -.09, -.10, -.11, -.17 and -.26.

~~1200-02-12-.28~~ 0400-20-12-.28 Tritium Neutron Generator Target Source.

(1) Use of a tritium neutron generator target source, containing quantities not exceeding 30 curies (1,110 MBq) and in a well with a surface casing to protect fresh water aquifers, is subject to the requirements of this chapter except Rules ~~1200-02-12-.06~~ 0400-20-12-.06, -.12, and -.26.

(2) Use of a tritium neutron generator target source, containing quantities exceeding 30 curies (1,110 MBq) or in a well without a surface casing to protect fresh water aquifers, is subject to the requirements of this chapter except Rule ~~1200-02-12-.12~~ 0400-20-12-.12.

Authority: T.C.A. §§ 68-202-101 et seq., 68-202-201 et seq., and 4-5-201 et seq.